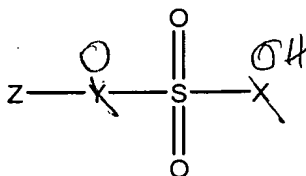


## CLAIMS

1. A biofilm resistant surface comprising an effective amount of bioavailable anti-fouling compound represented by general structure 1:



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wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR;

Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(CH_2)_m-R_{80}$ ;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(CH_2)_m-R_{80}$ ;

$R_{80}$  represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

m is an integer in the range 0 to 8 inclusive, or a salt thereof,

wherein the compound or a biologically active fragment thereof is released from the surface.

2. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br.

3. A biofilm resistant surface of claim 1, wherein Y represents O.

4. A biofilm resistant surface of claim 1, wherein Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

5. A biofilm resistant surface of claim 1, wherein Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

6. A biofilm resistant surface of claim 1, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

7. A biofilm resistant surface of claim 1, wherein R represents H or alkyl.

8. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Y represents O.

9. A biofilm resistant surface of claim 1, wherein X represents -OH or Cl; and Y represents O.

10. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

11. A biofilm resistant surface of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

12. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

13. A biofilm resistant surface of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

14. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-

dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

15. A biofilm resistant surface of claim 1, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

16. A biofilm resistant surface of claim 1, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

17. A biofilm resistant surface of claim 1, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

18. A biofilm resistant surface of claim 1, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

19. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

20. A biofilm resistant surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

21. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

22. A biofilm resistant surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

5 23. A biofilm resistant surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

10 24. A biofilm resistant surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

15 25. A biofilm resistant surface of claim 1, wherein the surface is a coating.

26. A biofilm resistant surface of claim 25, wherein the coating is temporary.

27. A biofilm resistant surface of claim 25, wherein the coating is semi-permanent.

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28. A biofilm resistant surface of claim 25, wherein the coating is permanent.

29. A biofilm resistant surface of claim 1, wherein the effective amount reduces the binding of organisms to a defined area of a surface for a defined period of time by a factor of at least for relative to a control surface.

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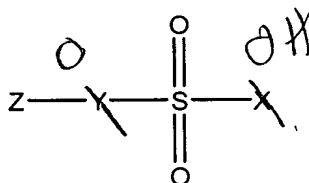
30. A biofilm resistant surface of claim 1, wherein the release rate of the compound from the surface is less than about  $50 \mu\text{gcm}^2\text{d}^{-1}$ .

31. A biofilm resistant surface of claim 1, wherein the release rate of the compound from the surface is less than about  $10 \mu\text{gcm}^2\text{d}^{-1}$ .

32. A biofilm resistant surface of claim 1, wherein the release of the compound is a sustained release.

33. A biofilm resistant surface of claim 1, wherein the the release of the compound is at a constant rate.

34. A coating comprising an effective amount of an anti-fouling compound represented by general structure 1:



wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR;

Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(\text{CH}_2)_m\text{-R}_{80}$ ;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(\text{CH}_2)_m\text{-R}_{80}$ ;

$\text{R}_{80}$  represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

m is an integer in the range 0 to 8 inclusive or a salt thereof,

wherein the coating releases the compound or a biologically active fragment thereof when in contact with a surface that is amenable to biofouling.

35. A coating of claim 34, wherein X represents -OH, F, Cl, or Br.

36. A coating of claim 34, wherein Y represents O.

5 37. A coating of claim 34, wherein Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

38. A coating of claim 34, wherein Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

39. A coating of claim 34, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

15 40. A coating of claim 34, wherein R represents H or alkyl.

41. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Y represents O.

42. A coating of claim 34, wherein X represents -OH or Cl; and Y represents O.

20 43. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

25 44. A coating of claim 34, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

45. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

46. A coating of claim 34, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

47. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

48. A coating of claim 34, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

49. A coating of claim 34, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

50. A coating of claim 34, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

51. A coating of claim 34, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

52. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

53. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

54. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

55. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

56. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

57. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

58. A coating of claim 57, wherein the coating is temporary.

59. A coating of claim 57, wherein the coating is semi-permanent.

60. A coating of claim 57, wherein the coating is permanent.

61. A coating of claim 34, wherein the effective amount reduces the binding of organisms to a defined area of a surface for a defined period of time by a factor of at least for relative to a control surface.

62. A coating of claim 34, wherein the release rate of the compound from the surface is less than about  $50 \mu\text{gcm}^2\text{d}^{-1}$ .



63. A coating of claim 34, wherein the release rate of the compound from the surface is less than about  $10 \mu\text{gcm}^2\text{d}^{-1}$ .

5 64. A coating of claim 34, wherein the release of the compound is a sustained release

65. A coating of claim 34, wherein the the release of the compound is at a constant rate

66. A coating of claim 34, which is a liquid.

67. A coating of claim 34, which is a gas or vapor.

68. A coating of claim 34, which is a paste or other semi-solid state.

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69. A coating of claim 34, which is a solid.

70. A coating of claim 34, which is a liquid and solidifies into a hard coating on a surface.

15 71. A coating of claim 34, which is a polish.

72. A coating of claim 34, which is a surface cleaner.

73. A coating of claim 34, which is a caulk

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74. A coating of claim 34, which is an adhesive.

75. A coating of claim 34, which is a finish.

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